General

Guideline Title

Care of the patient with mild traumatic brain injury.

Bibliographic Source(s)

Care of the patient with mild traumatic brain injury. Glenview (IL): American Association of Neuroscience Nurses, Association of Rehabilitation Nurses; 2011. 35 p. [161 references]

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

The levels of evidence (Class I-IV) supporting the recommendations and levels of recommendation (Level 1-3) are defined at the end of the "Major Recommendations" field.

Scope of the Problem

Definition of Mild Traumatic Brain Injury (MTBI)

Currently there is no definition for MTBI that is agreed upon internationally and across disciplines. For the most part, MTBI and concussion are used synonymously (Level 3), including in this guideline. Nurses should take an active part in the consensus work needed to continue to work toward a common definition of MTBI.

Epidemiology

The true incidence of MTBI is not known due to the lack of an agreed upon definition that is accepted internationally and across disciplines for the purposes of case finding. Well-designed multidisciplinary research is needed for a more complete understanding of the epidemiology of MTBI (Level 3).

Prevention

Health promotion efforts have been shown to successfully reduce the incidence of TBI (Level 2). Well-designed nursing research is needed to compare and test efficacy of translating these health promotion efforts to prevent MTBI (Level 3). For example, a comparison of face-to-face and online teaching methodologies has not been done.

Repetitive Injury

Nurses should include the effects of repeat concussions in discharge teaching following concussion (Level 2). Better designed nursing research is needed to compare and test methods of preventing repetitive injury (Level 3).

Review of Diagnostic Studies

Noncontrast Computed Tomography (CT) — Indications for Imaging

A noncontrast head CT is indicated in head trauma patients with loss of consciousness or posttraumatic amnesia only if one or more of the following is present: headache, vomiting, age greater than 60 years, drug or alcohol intoxication, deficits in short-term memory, physical evidence of trauma above the clavicle, posttraumatic seizure, Glasgow Coma Scale (GCS) score less than 15, focal neurologic deficit, or coagulopathy (Level 1; Jagoda et al., 2008).

A noncontrast head CT should be considered in a head trauma patient without loss of consciousness or posttraumatic amnesia if there is a focal neurologic deficit, vomiting, severe headache, age 65 years or greater, physical signs of a basilar skull fracture, GCS score less than 15, coagulopathy, or a dangerous mechanism of injury, including ejection from a motor vehicle, a struck pedestrian, and a fall from a height of more than 3 feet or 5 stairs (Level 2; Jagoda et al., 2008).

Children

CT scans should be protocolized to minimize the exposure of children to radiation (Level 2). Follow CHALICE criteria for pediatric patients 2 years of age or older (see Table 1 in the original guideline document); further work is needed to develop evidence-based criteria for CT scans for children under 2 years old (Level 2).

Magnetic Resonance Imaging (MRI)

With the development of new MRI techniques, earlier diagnosis of patients with clinically significant lesions could lead to earlier implementation of new medical and neuropsychological interventions for the prevention and treatment of post-concussive symptoms (PCS), learning disorders, and psychiatric conditions (Level 3).

Assessment and Monitoring

Timing

The guideline panel recommends an initial assessment, repeated hourly until the patient returns to baseline. Any decrease in neurologic status should prompt more frequent neurologic assessment and notification of the physician. Symptoms may not be resolved at the time of discharge from the emergency department (ED) or hospital; however, neurologic status should have returned to baseline prior to discharge. For most, this will be GCS 15, full motor strength, and being alert and oriented with no focal deficits. Further research is required to establish a clear timing frequency of assessments for concussion (Level 3).

Components of Assessment

Nurses should be alert for "red flags": altered consciousness, declining neurologic examinations, abnormal pupil response, seizures, vomiting, vision changes, worsening headache, disorientation, confusion, irritability, slurred speech, balance disturbance, and numbness or weakness in arms or legs (Level 3; Department of Veterans Affairs & Department of Defense, 2009).

- Assessment of balance to identify postural stability deficits is recommended (Level 3; McCrory et al., 2009). This testing is an advanced practice assessment; however, registered nurses should be aware of balance disturbances, observe patients getting up and walking, and ensure safety. Formal assessment of balance by advanced practice nurses, physicians, or rehabilitation specialists can be performed at the bedside and monitored with serial examinations when difficulties with balance are identified.

Fatigue and sleep difficulties as well as pain level and severity should be assessed on an ongoing basis (Level 2). Establishing baseline symptom experience and monitoring for symptom resolution is helpful for monitoring treatment response (Level 3).

Assessment Tools

Nurses caring for persons with concussion should be proficient at performing neurologic examinations, with reevaluations as indicated to detect improvement of decline in neurologic status following a concussion. Nurses should assess for post-concussive symptoms and educate patients and family about their presence and expected trajectory. Use of a single assessment measure for MTBI is not currently supported, but these assessment tools may be helpful for monitoring progress or decline in status. No specific symptom assessment tool is supported in the literature at

this time; however, incorporating a standardized measure into practice may be helpful to not miss subtle symptoms during assessment. Nurses should be aware of neuropsychological and neurocognitive testing that is available in order to educate patients about resources that are available should the patient need further testing and treatment (Level 3).

Patient Problems

Acute Problems

Posttraumatic Headaches

Nursing assessment or patient headache log should include (Level 3; Lew et al., 2006):

- Site of head injury and location of headache pain
- Pain radiation
- Type of pain (e.g., pulsating, dull, aching, sharp, etc.).
- Severity
- Duration
- Pain levels (e.g., Visual Analog Scale)
- Precipitating factors

Fatigue, Exhaustion, or Lack of Energy

Nurses should monitor drowsiness and fatigue in the acute period following injury as possible signs of central nervous system (CNS) deterioration (Level 3; Formisano, 2009). Nurses should also be aware of and assess for secondary causes of fatigue, including sleep disorders, pain, depression, anxiety, lifestyle, and medication side effects, all of which have been associated with a reduced tolerance for physical and mental activity (Level 2; Bushnik, Englander, & Wright, 2008).

Sleep Disturbance

Nurses should assess for sleep disturbance following MTBI (Level 2). Nurses can play a critical role in providing sleep hygiene education and, when appropriately trained, may be providers of cognitive behavior therapy for insomnia (CBT-I) as indicated.

Posture and Balance

Nurses should assess and document postural stability in the ED and on an ongoing basis post-injury (Level 2).

Chronic Problems and Rehabilitation Issues

PCS

Evidence-based treatment interventions for long-lasting PCS are not available, leading providers to focus on alleviating symptoms. Future research needs to consider validated risk-communication approaches, education strategies, and evaluation procedures in reference to MTBI and PCS treatment (Level 2).

Memory

When completing the assessment, the nurse should screen for potential risk factors that can cause ongoing memory impairments (Level 3; Evans, 1992), such as:

- Previous head injury
- Multiple trauma
- Age 40 years and older
- Alcohol and drug abuse
- Lower socioeconomic level
- Lower intellect level

Vestibular Symptoms (Shepard, Clendaniel & Ruchenstein, 2007)

Nurses should monitor and assess for the presence of vestibular symptoms following MTBI and provide appropriate referrals for additional treatment (Level 3). Nurses should also monitor patients on vestibular suppression therapy for therapeutic and potential adverse effects (Level 3).

Expected Outcomes

Initial Recovery

Any decline in neurologic status should prompt more frequent assessments as well as a medical evaluation (Level 2).

Functional Outcomes

Nurses should provide support and advocate for patients following MTBI as they return to usual activities (Level 2). Nurses should provide education regarding the trajectory of recovery and expectations in order to promote optimal recovery (Level 2).

Risk Factors for Poor Outcome

Nurses should be aware of and assess for risk factors for poor outcome following MTBI (Level 2). In cases where there is a modifiable risk factor (e.g., pain, lack of support), nurses should provide appropriate intervention in order to mediate their effect on outcome (Level 3).

Definitions:

Levels of Evidence

Class I: Randomized controlled trial without significant limitations or meta-analysis

Class II: Randomized controlled trial with important limitations (e.g., methodological flaws, inconsistent results); observational study (e.g., cohort, case control)

Class III: Qualitative study, case study, or series

Class IV: Evidence from reports of expert committees and/or expert opinion of the guideline panel, standards of care, and clinical protocols that have been identified

Levels of Recommendations

Level 1: Recommendations are supported by class I evidence.

Level 2: Recommendations are supported by class II evidence.

Level 3: Recommendations are supported by class III and class IV evidence.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Mild traumatic brain injury (MTBI; concussion)

Note: The terms MTBI and concussion are used synonymously in this guideline.

Guideline Category

Counseling

Diagnosis

Evaluation

Management

Prevention

Risk Assessment

Treatment

Clinical Specialty

Geriatrics

Neurology

Nursing

Pediatrics

Radiology

Intended Users

Advanced Practice Nurses

Nurses

Guideline Objective(s)

- To provide recommendations based on current evidence that will help registered nurses, advanced practice nurses, and institutions provide safe and effective care to injured patients with a mild traumatic brain injury (MTBI)
- To offer evidence-based recommendations on nursing activities that have the potential to maximize outcomes for persons following MTBI

Target Population

Patients with mild traumatic brain injury (concussion)

Interventions and Practices Considered

Diagnosis/Evaluation

1. Noncontrast computed tomography (CT)
2. Magnetic resonance imaging (MRI)
3. Biomarkers (not routinely recommended)
4. Initial assessment, including patient history
5. Use of a validated assessment tool, such as Glasgow Coma Score

Treatment/Management/Risk Assessment

1. Hourly assessments
2. Monitoring for symptom resolution and treatment response
3. Monitoring and treatment of comorbid conditions
4. Assessment of poor outcome risk factors

Prevention/Counseling

1. Health promotion counseling
2. Discharge teaching

Major Outcomes Considered

- Changes in type, severity, and duration of headaches
- Changes in Glasgow Coma Score (GCS)
- Incidence of sleep disturbance
- Incidence of vestibular symptoms
- Rate of development of psychiatric outcomes
- Rate of return from mild traumatic brain injury to previous functional level

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

A computerized search of MEDLINE, The Cochrane Collaboration, EMBASE, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) was performed using mild head injury, mild traumatic brain injury, and concussion as keywords. The search was restricted to works in English published from 2005 through November 2010. The reference lists of identified articles were also searched for additional relevant references including books, guidelines, and articles.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Levels of Evidence

Class I: Randomized controlled trial without significant limitations or meta-analysis

Class II: Randomized controlled trial with important limitations (e.g., methodological flaws or inconsistent results), observational studies (e.g., cohort or case control)

Class III: Qualitative studies, case study, or series

Class IV: Evidence from reports of expert committees and expert opinion of the guideline panel, standards of care, and clinical protocols

Methods Used to Analyze the Evidence

Systematic Review

Description of the Methods Used to Analyze the Evidence

A panel of nursing experts determined the level of evidence for each study included under every recommendation, summarizing the level of evidence for each recommendation.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

The Clinical Practice Guidelines recommendations for practice are established based upon the evaluation of the available evidence.

Rating Scheme for the Strength of the Recommendations

Levels of Recommendation

Level 1: Recommendations are supported by class I evidence.

Level 2: Recommendations are supported by class II evidence.

Level 3: Recommendations are supported by class III and IV evidence.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Peer Review

Description of Method of Guideline Validation

The guideline underwent peer review by a panel of reviewers listed in the guideline document.

Evidence Supporting the Recommendations

References Supporting the Recommendations

Bushnik T, Englander J, Wright J. The experience of fatigue in the first 2 years after moderate-to-severe traumatic brain injury: a preliminary report. J Head Trauma Rehabil. 2008 Jan-Feb;23(1):17-24. PubMed

Department of Veterans Affairs, Department of Defense. VA/DoD clinical practice guideline for management of concussion/mild traumatic brain injury (mTBI). [Internet]. Washington (DC): Department of Veteran Affairs, Department of Defense; 2009 [accessed 2011 Mar 24].

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Formisano R, Bivona U, Catani S, D'Ippolito M, Buzzi MG. Post-traumatic headache: facts and doubts. J Headache Pain. 2009 Jun;10(3):145-52. [44 references] PubMed

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Lew HL, Lin PH, Fuh JL, Wang SJ, Clark DJ, Walker WC. Characteristics and treatment of headache after traumatic brain injury: a focused review. Am J Phys Med Rehabil. 2006 Jul;85(7):619-27. [45 references] PubMed

McCrory P, Meeuwisse W, Johnston K, Dvorak J, Aubry M, Molloy M, Cantu R. Consensus statement on concussion in sport--the 3rd International Conference on concussion in sport, held in Zurich, November 2008. J Clin Neurosci. 2009 Jun;16(6):755-63. [148 references] PubMed

Shepard NT, Clendaniel RA, Ruckenstein M. Balance and dizziness. In: Zasler ND, Katz DI, Zafonte RD, editor(s). Brain injury medicine: Principles and practice. New York: Demos; 2007. p. 491-510.

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for selected recommendations (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate management and treatment of patients with mild traumatic brain injury (MTBI) may improve patient outcomes.

Potential Harms

Children

A noncontrast computed tomography (CT) scan is not without some risk. The radiation exposure from a head CT is equal to about 20 chest X rays (two rems). In children, whose brain cells are rapidly growing, this exposure presents a life-long risk of developing cancer and a decrease in cognitive function.

Medications

- As medications can impede neuronal recovery of the brain and negatively impact cognitive abilities, it is important for patients to fully disclose to healthcare providers all current medications, including over-the-counter medications, herbal supplements, illicit drugs, and blood thinners.
- Aspirin or anticoagulants and alcohol may exacerbate symptoms or prolong recovery time.
- Brain-injured patients have a heightened sensitivity to medication with increased risk for side effects.

Contraindications

Contraindications

Patients undergoing magnetic resonance imaging (MRI) scans should be assessed for the presence of ferromagnetic foreign bodies such as metal in the orbits, pacemakers, aneurysm clips, coils and ventricular shunt (VPS) catheters, and implanted pumps or stimulators. The radiologist should be made aware of any of these findings as they may contraindicate the MRI or require posttest reprogramming in that patient. Skull X rays should be obtained for any patient with possible exposure to metal fragments in the orbits prior to obtaining an MRI. Patients with pacemakers may not undergo an MRI as the pacemaker leads may heat the surrounding cardiac tissues and cause damage to the myocardium. Aneurysm clips and coils, besides creating artifact on the image, may be contraindicated depending on the manufacturer. VPS valves will need to be reset after undergoing an MRI if the valve contains an adjustable magnetic spring device.

Qualifying Statements

Qualifying Statements

- The authors, editors, and publisher of this document neither represent nor guarantee that the practices described herein will, if followed, ensure safe and effective patient care. The authors, editors, and publisher further assume no liability or responsibility in connection with any information or recommendations contained in this document. These recommendations reflect the American Association of Neuroscience Nurses' judgment regarding the state of general knowledge and practice in this field as of the date of publication and are subject to change based on the availability of new scientific information.
- As a result of the high profile of traumatic brain injury (TBI)—particularly injuries that are blast-related—new medical, nursing, and rehabilitation treatments are frequently emerging. Resources and recommendations must describe the best practices that can enable nurses to provide optimal care for persons following mild TBI (MTBI). Accordingly, adherence to these guidelines is voluntary, and the ultimate determination regarding their application must be made by practitioners in light of each patient's individual circumstances. This reference is an essential resource for nurses providing care to persons following MTBI. It is not intended to replace formal learning but rather to augment clinicians' knowledge base and provide a readily accessible reference tool. The AANN, the Association of Rehabilitation Nurses (ARN), and the nursing field are indebted to the volunteers who have devoted their time and expertise to this valuable resource, created for those who are committed to excellence in the care of brain-injured patients.
- This guideline is not intended to replace formal learning but rather to augment clinicians' knowledge base and provide a readily accessible reference tool.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Chart Documentation/Checklists/Forms

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

IOM Domain

Effectiveness

Patient-centeredness

Safety

Timeliness

Identifying Information and Availability

Bibliographic Source(s)

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Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2011

Guideline Developer(s)

American Association of Neuroscience Nurses - Professional Association

Association of Rehabilitation Nurses - Professional Association

Source(s) of Funding

American Association of Neuroscience Nurses

This publication was supported by an educational grant from the Defense and Veterans Brain Injury Center.

Guideline Committee

Not stated

Composition of Group That Authored the Guideline

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A staff member, volunteer or family member who has an affiliation with a commercial company must declare that relationship in advance of involvement with an education activity that could be used as a forum to promote interest of that company and its products. None of the authors or planners has anything to disclose related to this activity.

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the American Association of Neuroscience Nurses Web site .

Availability of Companion Documents

The following is available:

- Care of the patient with mild traumatic brain injury - CPG online exam. Available from the American Association of Neuroscience Nurses Web site .

The Rivermead Postconcussion Symptoms Questionnaire is available in Appendix A of the original guideline document.

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on January 23, 2012. The information was verified by the guideline developer on February 2, 2012.

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